REMARKS/ARGUMENTS

Submitted with the present Amendment, is a Request for Continued Examination (RCE) under 37 CFR 1.114 for the above-identified application. The Director is hereby authorized to charge the requisite RCE fee under 37 CFR 1.17(e), any underpayment of fees, or credit any overpayments, to Deposit Account No. 20350.

Claims 21-40 are pending in this application. Claims 21-23 are amended herein. Claims 24-40 are added herein. Basis for these amendments and newly added claims is found throughout the specification and claims as originally filed. For example, basis for the amendments in claim 21 may be found in paragraph [0048] and Figure 3; basis for the amendments in claim 32 may be found in paragraph [0046], Figure 1 and original claim 11; basis for the amendments in claim 33 may be found in paragraph [0045] and original claims 1-14; basis for the amendments in claims 35 and 36 may be found in paragraph [0037]; basis for the amendments in claim 37 may be found in original claim 1; basis for the amendments in claim 38 may be found in paragraph [0039] and Figure 4; and basis for the amendments in claims 39 and 40 may be found in paragraph [0040]. No new matter has been added.

Claim Rejections - 35 USC § 103

The Office Action has rejected claims 21-22 under 35 U.S.C. §103(a) as allegedly being obvious over Von Sturm et al. (USP 3,574,560), in view of Molter et al. (USP 4,818,637), in view of Gallagher (USP 3,895,102), and in view of Richman (USP 3,669,751). The Action has also rejected claim 23 under 35 U.S.C. §103(a) as allegedly being obvious over Von Sturm, in view of Molter, in view of Gallagher, in view of Richman, and further in view of Knowlton et al. (US 2001/0013321 A1). Applicants respectfully disagree.

As amended herein, the claimed invention distinguishes over the cited references by claiming methods for generating hydrogen gas, wherein **hydroxide solution at approximately 180 degrees Fahrenheit completely covers the aluminum in the gas generating tank**. Applicants have surprisingly found that completely covering the aluminum in the gas generating tank with hydroxide solution at approximately 180 degrees Fahrenheit

provides for a uniform rate of reaction of the aluminum in the tank without a build-up of residue on the aluminum surface. Thus, on repeated exposure to the heated hydroxide solution, the intact, residue free aluminum surface provides for a consistent, uniform high rate of hydrogen gas production. Furthermore, applicants have found that at approximately 180 degrees Fahrenheit, the heated hydroxide solution reacts with the aluminum at a sufficient rate to generate significant quantities of hydrogen gas. In contrast, lower temperatures lead to insufficient hydrogen gas generation, and higher temperatures produces mostly steam.

Von Sturm does not teach or suggest any such methods. Instead, this reference teaches methods for producing gaseous reactants, whereby the development of gas is automatically adjusted to the gas absorption of the consumer. In particular, this reference teaches methods for generating hydrogen gas using a device in which the opening a valve in a gas outlet tube of a reaction vessel containing aluminum rods, causes a drop in pressure in the reaction vessel, and a transfer of liquid (e.g., KOH solution) from the lower part of a sealed storage container to the reaction vessel through a connecting pipe. Hydrogen gas is generated when the liquid comes into contact with the rods. An increase in hydrogen gas consumption results in a decrease in pressure in the reaction vessel, and a transfer of more hydroxide solution from the storage container to the reaction vessel. Conversely, a decrease in hydrogen gas consumption results in an increase in pressure in the reaction vessel, and a transfer of hydroxide solution from the reaction vessel to the storage container. This reference however, does not teach or suggest any methods for generating hydrogen gas, wherein hydroxide solution at approximately 180 degrees Fahrenheit completely covers aluminum in a gas generating tank as required by the instant claims. Nor does this reference teach or suggest the unexpected advantages of completely covering the aluminum with hydroxide solution at 180 degrees Fahrenheit as described for the instantly claimed invention. Absent a teaching or suggestion, one of skill in the art would not have been motivated to do what the Applicants now claim. Nor would one of skill in the art have any reasonable expectation of success based on the teachings of this reference. Von Sturm teaches devices for producing gaseous reactants, whereby the generation of gas is automatically adjusted to the gas absorption of the consumer. This reference does not teach or suggest any methods for generating hydrogen gas by completely covering the

aluminum in a gas generating tank with hydroxide solution at approximately 180 degrees Fahrenheit, which provides for uniform rates of reaction of the aluminum in the tank without a build-up of residue on the aluminum surface and consequently, affords a consistent, uniform high rate of hydrogen gas production, as required by the instant claims.

Molter does not cure the defects of Von Sturm because this reference does not teach or suggest any methods for generating hydrogen gas, wherein hydroxide solution at approximately 180 degrees Fahrenheit completely covers aluminum in a gas generating tank as required by the instant claims. Instead, this reference teaches methods for operating a conventional solid polymer electrolyte membrane hydrogen/halogen fuel cell by humidifying the hydrogen gas prior to it entering the anode chamber thereby providing additional water to be protonically pumped through the membrane to the cathode where it dilutes the acid produced by the anode. This reference however, does not teach or suggest any methods for generating hydrogen gas, wherein hydroxide solution at approximately 180 degrees Fahrenheit completely covers aluminum in a gas generating tank. Nor does this reference teach or suggest the unexpected advantages of completely covering the aluminum with hydroxide solution at 180 degrees Fahrenheit as described for the instantly claimed invention. Absent a teaching or suggestion, one of skill in the art would not have been motivated to do what the Applicants now claim. Nor would one of skill in the art have any reasonable expectation of success based on the teachings of this reference. Molter teaches methods for operating a conventional solid polymer electrolyte membrane hydrogen/halogen fuel cell by humidifying the hydrogen gas prior to it entering the anode chamber thereby providing additional water to be protonically pumped through the membrane to the cathode where it dilutes the acid produced by the anode. This reference does not teach or suggest any methods for generating hydrogen gas by completely covering the aluminum in a gas generating tank with hydroxide solution at approximately 180 degrees Fahrenheit, which provides for uniform rates of reaction of the aluminum in the tank without a build-up of residue on the aluminum surface and consequently, affords a consistent, uniform high rate of hydrogen gas production, as required by the instant claims.

Gallagher does not cure the defects of Von Sturm or Molter because this reference does not teach or suggest any methods for generating hydrogen gas, wherein hydroxide solution

at approximately 180 degrees Fahrenheit completely covers aluminum in a gas generating tank as required by the instant claims. Instead, this reference teaches reacting solid porous rigid fuel compositions with hydroxide solution to generate hydrogen gas. These compositions are taught as comprising silicon-containing metal particles such as ferrosilicon bonded together into a rigid porous mass; and a powdered salt compound such as an alkali metal halide like sodium chloride. The presence of the salt compound within the porous mass is taught to inhibit the formation of slow dissolving silicate cement on the surface of the silicon metal particles on repeated reaction with hydroxide solution, thus preventing a reduction in the reaction rate or generation rate of hydrogen gas. In particular, column 10, lines 19-30 of this reference, teaches ways for evaluating cemented porous ferrosilicon rods containing various salt compounds, by visually observing the nature and extent of the reaction when the test samples were inserted into a 20% liquid hydroxide solution at 80-85°C. This reference however, does not teach or suggest any methods for generating hydrogen gas, wherein hydroxide solution at approximately 180 degrees Fahrenheit completely covers aluminum in a gas generating tank. Nor does this reference teach or suggest the unexpected advantages of completely covering the aluminum in the gas generating tank with hydroxide solution at 180 degrees Fahrenheit as described for the instantly claimed invention. Absent a teaching or suggestion, one of skill in the art would not have been motivated to do what the Applicants now claim. Nor would one of skill in the art have any reasonable expectation of success based on the teachings of this reference. Gallagher teaches methods for generating hydrogen gas by reacting solid porous rigid fuel compositions with hydroxide solution. This reference does not teach or suggest any methods for generating hydrogen gas by completely covering the aluminum in a gas generating tank with hydroxide solution at approximately 180 degrees Fahrenheit, which provides for uniform rates of reaction of the aluminum in the tank without a build-up of residue on the aluminum surface and consequently, affords a consistent, uniform high rate of hydrogen gas production, as required by the instant claims.

Richman does not cure the defects of Von Sturm, Molter or Gallagher because this reference does not teach or suggest any methods for generating hydrogen gas, wherein hydroxide solution at approximately 180 degrees Fahrenheit completely covers aluminum in a

gas generating tank as required by the instant claims. Instead, this reference teaches electric batteries of very high capacity per pound comprising a self-balancing system of a hydrogen-oxygen fuel cell, a circulating KOH electrolyte and a hydrogen generator in which an Si-Al mixture is reacted with the electrolyte to produce hydrogen and an insoluble aluminum silicate, thus taking up the water generated in the fuel cell. This reference however, does not teach or suggest any methods for generating hydrogen gas, wherein hydroxide solution at approximately 180 degrees Fahrenheit completely covers aluminum in a gas generating tank as required by the instant claims. Nor does this reference teach or suggest the unexpected advantages of completely covering the aluminum in the gas generating tank with hydroxide solution at 180 degrees Fahrenheit as described for the instantly claimed invention. Absent a teaching or suggestion, one of skill in the art would not have been motivated to do what the Applicants now claim. Nor would one of skill in the art have any reasonable expectation of success based on the teachings of this reference. Richman teaches electric batteries of very high capacity per pound comprising a self-balancing system of a hydrogen-oxygen fuel cell, a circulating KOH electrolyte and a hydrogen generator in which an Si-Al mixture is reacted with the electrolyte to produce hydrogen and an insoluble aluminum silicate, thus taking up the water generated in the fuel cell. This reference does not teach or suggest any methods for generating hydrogen gas by completely covering the aluminum in a gas generating tank with hydroxide solution at approximately 180 degrees Fahrenheit, which provides for uniform rates of reaction of the aluminum in the tank without a build-up of residue on the aluminum surface and consequently, affords a consistent, uniform high rate of hydrogen gas production, as required by the instant claims.

Nor does Knowlton cure the defects of Von Sturm, Molter, Gallagher or Richman because this reference does not teach or suggest any methods for generating hydrogen gas, wherein hydroxide solution at approximately 180 degrees Fahrenheit completely covers aluminum in a gas generating tank as required by the instant claims. Instead, this reference teaches fuel supply systems for use with a vehicle propulsion system such as an internal combustion engine or a fuel cell system, wherein the fuel supply system includes a water supply, fuel supply, and fuel conversion device coupled to the water and fuel supplies for generating

hydrogen from the water and fuel and supplying the hydrogen to an intake manifold of the propulsion system with which the fuel supply system is used. This reference however, does not teach or suggest any methods for generating hydrogen gas, wherein hydroxide solution at approximately 180 degrees Fahrenheit completely covers aluminum in a gas generating tank as required by the instant claims. Nor does this reference teach or suggest the unexpected advantages of completely covering the aluminum in the gas generating tank with hydroxide solution at 180 degrees Fahrenheit as described for the instantly claimed invention. Absent a teaching or suggestion, one of skill in the art would not have been motivated to do what the Applicants now claim. Nor would one of skill in the art have any reasonable expectation of success based on the teachings of this reference. Knowlton teaches fuel supply systems for use with a vehicle propulsion system, wherein the fuel supply system includes a water supply, fuel supply, and fuel conversion device coupled to the water and fuel supplies for generating hydrogen from the water and fuel and supplying the hydrogen to an intake manifold of the propulsion system with which the fuel supply system is used. This reference does not teach or suggest any methods for generating hydrogen gas by completely covering the aluminum in a gas generating tank with hydroxide solution at approximately 180 degrees Fahrenheit, which provides for uniform rates of reaction of the aluminum in the tank without a build-up of residue on the aluminum surface and consequently, affords a consistent, uniform high rate of hydrogen gas production, as required by the instant claims.

In view of the foregoing, Applicants respectfully request reconsideration and removal of these rejections.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at the number provided below.

Respectfully submitted,

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